Intact Rangelands Outcompete Focal Species as a More Efficient Surrogate for Conservation in The Northern Great Plains

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Maps of species-habitat relationships often underlie our strategies to identify and prioritize areas for conservation. Often a single surrogate species drives conservation design, with the assumption that conservation actions for a well selected species will confer benefits to a broader community. Recent advances in systematic conservation planning coupled with increasingly available spatial data have helped planners incorporate requirements of multiple species. Yet, multispecies prioritization algorithms are still challenged by how to objectively 'weight' varying attributes, which has tremendous impacts on resulting area-based prioritizations. We developed an approach to quantify 'strength of surrogacy' among species, by building individual models and measuring their ability to encompass a broader wildlife community. We applied our approach to a suite of species models used for conservation targeting in the imperiled grasslands and sagebrush steppe of the Northern Great Plains, where prioritization can help stem the loss of private grazing lands to cultivation. This approach allowed us to measure the relative efficacy of different species as surrogates, and provided a metric to weight models among multispecies algorithms. In this test, we also considered a simple surrogate of intact rangelands, fully agnostic to species data, representing a null model for conservation targeting. Prioritization outputs weighted by species strength of surrogacy among intact parcels give practitioners a roadmap for future investments to maintain these already functioning landscapes for conservation. Furthermore, our measure of intactness vastly outperformed any species model as a surrogate for conservation, highlighting the efficacy of strategies that target large and intact cores for wildlife conservation.